HON PRECALCULUS Name:_____

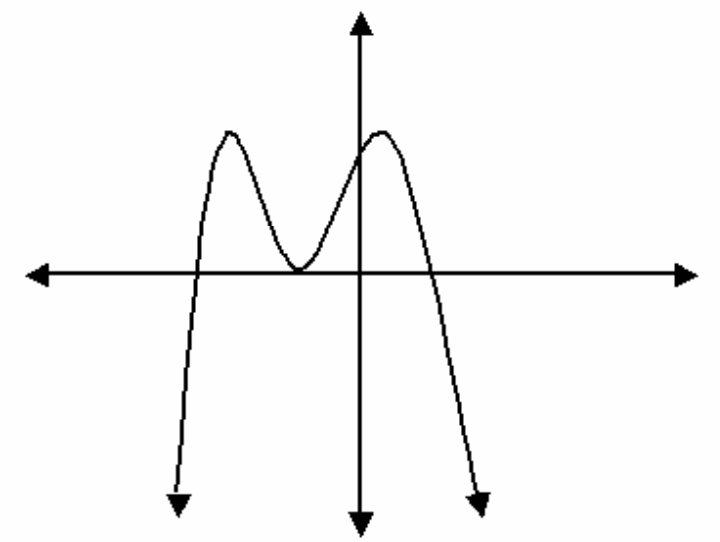
Test Rejects From A Finely Crafted O'Brien Unit 2 Test

1. Solve $y^3 - 6y^2 + 8y < 0$.

2. Solve, giving all real and imaginary roots.

$x^3 - 2x + 4 = 0$

3. Give an equation of a polynomial function that could have the graph below. Explain why your function could have the given graph.



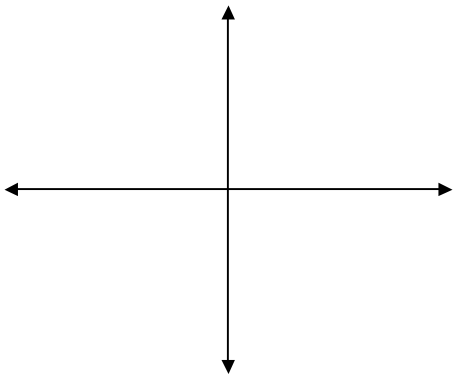
4. Factor completely: $x^3 - 3x^2 - 6x + 8$

5.
The polynomial $x^3 + ax^2 - 3x + b$ is divisible by $(x-2)$ and has a remainder 6 when divided by $(x+1)$. Find the value of a and of b.

6. Solve the following equation (Hint: consider using a graphic method).

$$1 + x = 2^x$$

7. Sketch a graph $y = 2^{\log_2 x}$. What is the domain of this function?



8. At the right is a "solution" to the equation $100 = 18e^{4k}$.

a. Check the answer $k \approx 0.398$ back in the equation $100 = 18e^{4k}$ and show that it doesn't work.

b. Circle the error in the "solution" and give a correct solution below.

$$100 = 18e^{4k}$$
$$\ln 100 = \ln\left(18e^{4k}\right)$$
$$\ln 100 = \ln 18 \ln\left(e^{4k}\right)$$
$$\frac{\ln 100}{\ln 18} = \ln\left(e^{4k}\right)$$
$$\frac{\ln 100}{\ln 18} = 4k$$
$$\frac{\ln 100}{4 \ln 18} = k$$
$$k \approx 0.398$$

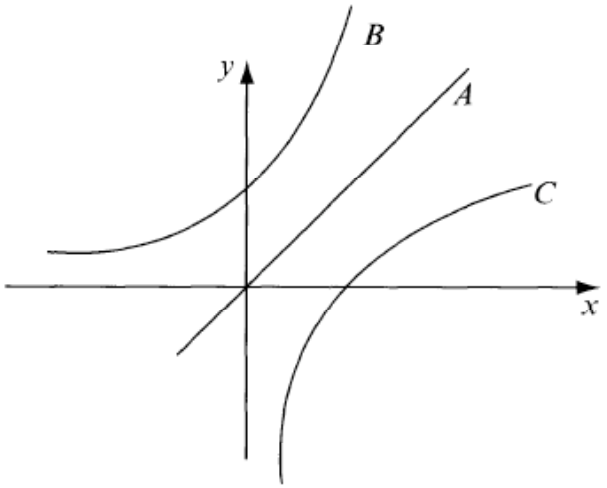
9. Given that $\log_a b \approx 1.7712$, approximate

a. $\log_a ab$ b. $\log_b a$ c. $\log_a \frac{1}{b^2}$

10. Consider the expression $y = 3\ln x$. What happens to y if x triples?

11.

The diagram shows three graphs.



A is part of the graph of $y = x$.

B is part of the graph of $y = 2^x$.

C is the reflection of graph B in line A.

Write down

(a) the equation of C in the form $y = f(x)$;

(b) the coordinates of the point where C cuts the x-axis.

12. True or false. If false, give a reason why.

a. $\log_{-2} 4 = 2$

b. $\ln(5 + x) = \ln 5 \ln x$

c. $\log_7 \frac{1}{2} = -\log_7 2$

d. $10^{\log 10^{10}} = 10$

e. $\log x - \log 2 = \frac{\log x}{\log 2}$

f. $\log 4 = \frac{1}{2}\log 16$

g. $\log\left(-\frac{1}{100}\right) = -2$

h. $\log_b 8 = \log_b 8 + \log_b 0$

13. Find the **exact** value of x satisfying the equation

$$(3^x)(4^{2x+1}) = 6^{x+2}.$$

Give your answer in the form $\frac{\ln a}{\ln b}$ where $a, b \in \mathbb{Z}$.